

I CLAIM:

1. A folding knife, comprising:

a handle defining a blade cavity and a first end;

a blade having a first end and a second end opposite said first end; said first end of said

blade having a blade pivot connected to said first end of said handle for

pivotal movement of said blade about said blade pivot between an extended

position wherein the blade is outside of said blade cavity and a retracted

position wherein the blade is substantially within said blade cavity;

a longitudinally extending plunger carried in said blade cavity having a first end and

second end opposite said first end;

a pivotal connector pivotally connected to said handle for pivotally connecting said

plunger to said handle, said first end of said plunger being longitudinally

slidably carried by said pivotal connector for longitudinal movement of said

plunger relative to said pivotal connector as said blade moves between said

retracted and extended positions; and

said second end of said plunger being pivotally connected to said first end of said blade

for orbital movement about said blade pivot as said blade moves between said retracted

and extended positions.

2. A folding knife as defined in claim 1, wherein said blade includes said first end of said blade having an extension projecting outwardly from said handle when said blade is in said retracted position; said extension defining an extreme edge portion with a plurality of ridges thereon for contact by a user when moving the blade from said retracted position to said extended position.

3. A folding knife as defined in claim 2, wherein said plurality of ridges are generally saw-tooth-shaped and are generally angled in a direction substantially opposite to the direction said second end of said blade moves when moving from said retracted position to said extended position.

4. A knife as set forth in claim 1, further comprising a safety member pivotally connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into said blade cavity and in the path of movement of said first end of the plunger when said safety member is in said locking position for contacting and restraining movement of said first end of said plunger when said blade is in said extended position, to thereby lock said blade in said extended position.

5. A knife as defined in claim 1, further comprising said handle defining a first side and a second side opposite said first side and a belt clip connected to said handle adjacent one of said first and second sides of said handle.

6. A knife as defined in claim 1, wherein said pivotal connector includes a sleeve having a passageway, and wherein said first end of said plunger extends through said passageway such that said first end of said plunger moves substantially rectilinearly in said passageway during said longitudinal movement of said plunger as said blade is moved between said retracted and extended positions.

7. A folding knife as defined in claim 1, wherein said pivotal connector is a sleeve having diametrically opposed pivot pins attached thereto, said pivot pins pivotally connecting said pivotal connector within said handle.

8. A folding knife as set forth in claim 1, wherein said second end of said plunger includes a clevis having a pin pivotally connected to said first end of said blade.

9. A folding knife as defined in claim 1, wherein said first end of said blade includes an arcuate slot and wherein said handle includes a pin carried in said arcuate slot, said arcuate slot having a first end and a second end, and said first end of said arcuate slot limiting said blade from movement beyond said extended position.

10. A knife as defined in claim 1, further comprising a coil spring encircling said plunger.

556
513
11. A folding knife, comprising:

a handle defining a blade cavity and a first end;

a blade having a first end and a second end opposite said first end; said first end of said

blade having a blade pivot connected to said first end of said handle for

pivotal movement of said blade about said blade pivot between an extended

position wherein the blade is outside of said blade cavity and a retracted

position wherein the blade is substantially within said blade cavity;

a spring longitudinally extending plunger carried in said blade cavity having a first end

and second end opposite said first end;

a sleeve provided in said handle, said sleeve receiving and longitudinally slidably

carrying said first end of said plunger for longitudinal movement of said

plunger relative to said sleeve as said blade moves between said retracted

and extended positions; and

said second end of said plunger being pivotally connected to said first end of said blade

for orbital movement about said blade pivot as said blade moves between

said retracted and extended positions.

12. A folding knife, comprising:

a handle defining a blade cavity and a first end;

a blade having a first end and a second end opposite said first end; said first end of said

blade having a blade pivot connected to said first end of said handle for pivotal

movement of said blade about said blade pivot between an extended position

wherein the blade is outside of said blade cavity and a retracted position wherein

the blade is substantially within said blade cavity; and

a longitudinally extending plunger having:

a first end slidably connected to said handle for longitudinal movement of said

plunger relative to said handle as said blade moves between said retracted

and extended positions; and

a second end opposite said first end, said second end of said plunger pivotally

connected to said first end of said blade for orbital movement about said

blade pivot as said blade moves between said retracted and extended

positions.

13. A knife as defined in claim 12, wherein said blade includes said first end of said

blade having an extension projecting outwardly from said handle when said blade is in

said retracted position; said extension defining an extreme edge portion with a plurality

of ridges thereon for contact by a user when moving the blade from said retracted

position to said extended position.

14. A knife as defined in claim 12, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger when said safety member is in said locking position for contacting and
5 restraining movement of said plunger when said blade is in said extended position, to thereby lock said blade in said extended position.

15. A knife as defined in claim 12, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

16. A knife as defined in claim 12, further comprising said handle defining a first side and a second side opposite said first side and a belt clip connected to said handle adjacent
15 one of said first and second sides of said handle.

17. A knife as defined in claim 12, wherein said second end of said plunger includes a clevis having a pin pivotally connected to said first end of said blade.

18. A knife as defined in claim 12, wherein said first end of said blade includes an arcuate slot and wherein said handle includes a pin carried in said arcuate slot, said arcuate slot having a first end and a second end, and said first end of said arcuate slot limiting said blade from movement beyond said extended position.

5

19. A knife as defined in claim 12, further comprising a spring operatively interconnecting said plunger to said handle.

20. A knife as defined in claim 19, wherein the spring exerts a pivoting force upon the blade in response to the spring being deformed, the spring being maximally deformed when the blade is pivoted to an intermediate point between the extended position and retracted position, thereby causing the spring to assist opening of the blade when the blade is pivoted from the retracted position toward the extended position beyond the intermediate point.

15

21. A knife as defined in claim 12, further comprising a coil spring operatively interconnecting said plunger to said handle.

22. A knife as defined in claim 12, wherein the coil spring encircles said plunger.

20

23. A folding knife, comprising:

a handle defining a blade cavity and a first end;

a blade having a first end and a second end opposite said first end; said first end of said

blade having a blade pivot connected to said first end of said handle for pivotal

movement of said blade about said blade pivot between an extended position

wherein the blade is outside of said blade cavity and a retracted position wherein

the blade is substantially within said blade cavity; and

a spring operatively connected between the blade and handle and configured to exert a

pivoting force upon the blade in response to the spring being deformed, the spring

being maximally deformed when the blade is pivoted to an intermediate point

between the extended position and retracted position, thereby causing the spring to

assist opening of the blade when the blade is pivoted from the retracted position

toward the extended position beyond the intermediate point.

15 24. A knife as defined in claim 23, wherein said blade includes said first end of said

blade having an extension projecting outwardly from said handle when said blade is in

said retracted position; said extension defining an extreme edge portion with a plurality

of ridges thereon for contact by a user when moving the blade from said retracted

position to said extended position.

25. A knife as defined in claim 23, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger when said safety member is in said locking position for contacting and restraining movement of said plunger when said blade is in said extended position, to thereby lock said blade in said extended position.

26. A knife as defined in claim 23, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

27. A knife as defined in claim 23, further comprising said handle defining a first side and a second side opposite said first side and a belt clip connected to said handle adjacent one of said first and second sides of said handle.

28. A knife as defined in claim 23, wherein said second end of said plunger includes a clevis having a pin pivotally connected to said first end of said blade.

29. A knife as defined in claim 23, wherein said first end of said blade includes an arcuate slot and wherein said handle includes a pin carried in said arcuate slot, said arcuate slot having a first end and a second end, and said first end of said arcuate slot limiting said blade from movement beyond said extended position.

5
30. A folding knife comprising:

a handle;

a blade pivoted on said handle for movement between stowed and deployed conditions relative to the handle; and

an elongate, force-transmitting biasing spring operatively interposed said handle and said blade, said spring, with movement of said blade generally from either one of such two conditions toward the other condition, exhibiting both a rise and a fall in the biasing force carried through the spring.

15 31. The knife of claim 30, wherein the mentioned rise and fall in biasing force occur in the order rise/fall.

32. The knife of claim 30, further comprising a plunger operatively interconnecting the spring to the blade.

33. A knife as defined in claim 32, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

34. A folding knife comprising:

a handle;

a blade pivoted on said handle for movement between stowed and deployed conditions relative to the handle; and

an elongate, force-transmitting biasing spring operatively interposed said handle and said blade, said spring, with movement of said blade generally from either one of such two conditions toward the other condition, exhibiting both an increase and a decrease in the overall length of the spring.

35. The knife of claim 34, wherein the mentioned increase and decrease occur in the order increase-decrease.

36. The knife of claim 34, further comprising a plunger operatively interconnecting the spring to the blade.

37. A knife as defined in claim 36, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

5

38. A folding knife comprising:

a handle;

a blade pivoted on said handle for movement between stowed and deployed conditions relative to the handle; and

a force-transmitting biasing spring operatively interposed said handle and said blade, said spring, with movement of said blade generally from either one of such two conditions toward the other condition, acting on said blade through a moment arm which extends through the pivot axis provided for the blade relative to the handle, and which changes in effective length, including a change which includes a pass through a zero dimension.

15

39. The knife of claim 38, wherein the mentioned length change occurs in the order decrease/zero dimension/increase.

20

40. The knife of claim 39, further comprising a plunger operatively interconnecting the spring to the blade.

41. A knife as defined in claim 40, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

5

42. A folding knife comprising:

a handle;

a blade pivoted on said handle for movement between stowed and deployed conditions relative to the handle; and

an elongate, force-transmitting biasing spring operatively interposed said handle and said blade, said spring, with respect to disposition of said blade in either one of such two conditions, acting as a/the principal, common structure which tends to hold the blade in that one condition.

10
15

43. The knife of claim 42, further comprising a plunger operatively interconnecting the spring to the blade.

20

44. A knife as defined in claim 43, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

45. A knife comprising:

a handle;

a blade pivotally held in the handle to move between a stowed position and a deployed position; and

a spring operatively interconnecting the blade to the handle, wherein the spring operates on the blade to maintain the blade in the stowed position when the blade is moved to the stowed position, and operates on the blade to urge the blade toward the deployed position when the blade is moved by an outside force from the stowed position at least partially toward the deployed position.

46. The knife of claim 45, further comprising a plunger operatively interconnecting the spring to the blade.

47. A knife as defined in claim 46, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.

48. A knife comprising:

a handle;

a spring movably held in the handle; and

a blade pivotally held in the handle by a pin, the blade pivotal between a stowed position and a deployed position,

wherein the spring is operatively connected to the blade at a point that moves with the blade as the blade moves from the stowed position to the deployed position, and
5 wherein the spring is operatively connected to the blade to exert a directional force on the blade that is at least approximately in line with the pin when the blade is in at least one position as it moves from the stowed toward the deployed position, but while the blade is closer to the stowed position than to the deployed position.

10 49. The knife of claim 48, further comprising a plunger operatively interconnecting the spring to the blade.

15 50. A knife as defined in claim 49, further comprising a safety member connected to said handle for movement between a locking position and an unlocking position; said safety member defining an engagement portion projecting into the path of movement of said plunger for contacting said plunger.